



# PATENT SPECIFICATION

299,635

Application Date: Dec. 19, 1927. No. 34,380/27.

Complete Left: March 20, 1928.

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## PROVISIONAL SPECIFICATION.

### Improvements in and relating to the Fuel Valves of Internal Combustion Engines.

We, RICHARDSONS, WESTGARTH AND COMPANY LIMITED, a British company, and WALTER SCOTT BURN, a British subject, both of Hartlepool Engine Works, Hartlepool, in the County of Durham, do hereby declare the nature of this invention to be as follows:—

This invention relates to the fuel valves of internal combustion engines and has for its object to provide a means of maintaining the fuel valves and nozzles cool without directly introducing cooling water to the valve body or nozzle.

The invention consists broadly in providing a water cooled insulating sleeve surrounding the valve body or nozzle.

In accordance with the invention we provide a sleeve, preferably of non-corrodible material surrounding the fuel valve and the major portion of its nozzle and this sleeve is so arranged in a pocket in the cylinder head that there is an annular chamber surrounding the greater portion of the sleeve. This pocket is open to the cooling water circulation of the cylinder head—or other part carrying the

fuel valves—and the arrangement is such that the cooling water passes through the annular space aforesaid surrounding the sleeve and passes thence to the water outlet.

According to the preferred arrangement the cooling water entering the cylinder head passes around the lower end of the sleeve aforesaid and up through the annular passage to the water outlet. In the event of two or more fuel valves being employed a corresponding number of water outlets will be employed.

The foregoing arrangement ensures a cool insulator around the fuel valve end and by providing cool surfaces round the nozzle end the arrangement will be found to prevent or minimise the formation of carbon about the nozzle orifices.

Dated this 19th day of December, 1927.

A. A. THORNTON,  
Chartered Patent Agent,  
Quality Court, Chancery Lane, London,  
W.C. 2,  
For the Applicants.

## COMPLETE SPECIFICATION.

### Improvements in and relating to the Fuel Valves of Internal Combustion Engines.

We, RICHARDSONS, WESTGARTH & COMPANY LIMITED, a British company, and WALTER SCOTT BURN, a British subject, both of Hartlepool Engine Works, Hartlepool, in the County of Durham, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to the fuel valves of internal combustion engines, by which term is herein meant a valved fuel injector as a whole embodying the actual valve together with its casing and attached spraying nozzle, and it has for its object to provide improved means for maintaining the fuel valve cool without directly

introducing cooling water to the fuel valve body.

In accordance with the invention the fuel valve is maintained cool by providing a sleeve surrounding the valve body and major portion of its nozzle so that said parts are completely insulated from the cylinder head or other valve carrying part and forming a pocket in the cylinder head or equivalent such that there is an annular chamber surrounding the greater portion of the sleeve, open to the cooling water circulation and through which the cooling water passes in the direction of the sleeve on its way to the outlet.

In the accompanying drawings Fig. 1 is a sectional view of part of a cylinder head and a fuel valve protected in accord-

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ance with the present invention. Fig. 2 shows one arrangement according to the invention and Fig. 3 is a horizontal section through Fig. 2.

5 According to the invention the whole of the valve assembly, generally designated herein by the numeral 1, which extends into the casing is protected by a sleeve 4, the lower end of the nozzle 5 alone protruding through the inner end thereof, and this sleeve 4 is arranged in a pocket 6  
10 formed by the apron 7 which extends nearly to the bottom of the casing 2.

The cooling water entering the cylinder head, i.e., the so-called casing 2, passes  
15 around the lower end of the sleeve 4 and up through the annular passage or pocket 6 to the water outlet 8, this taking place at each valve, when more than one is employed.

20 In Figs. 2 and 3 two fuel injection valves 1 are employed arranged diametrically opposite each other within the casing 2 having four equidistantly spaced inlet passages 3 connected to the main engine cooling-water system.

25 The sleeve 4 may be formed with annular fins 4<sup>x</sup> and be seated against packing 8<sup>a</sup> by the pressure upon a gland 9 so as to secure water-tightness.

30 The foregoing arrangement ensures a cool insulation around the fuel valve end and by providing cool surfaces round the nozzle end the arrangement will be found to prevent or minimise the formation of  
35 carbon about the nozzle orifices.

In Fig. 1 the cylinder head is shown as formed with a wall 10 which forms part

of a cylindrical housing for an air starting valve, as is customarily fitted.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In an internal combustion engine, maintaining the fuel valve cool by providing a sleeve surrounding the valve body and major portion of its nozzle so that said parts are completely insulated  
40 from the cylinder head, or other valve carrying part and forming a pocket in the cylinder head or equivalent such that there is an annular chamber surrounding the greater portion of the sleeve, open to  
45 the cooling water circulation and through which the cooling water passes in the direction of the sleeve on its way to the outlet.

2. In an internal combustion engine, means for maintaining the fuel valve cool as claimed in Claim 1, embodying an insulating sleeve constructed and secured in the pocket of a water-containing casing, substantially as described and illustrated in the accompanying drawings.

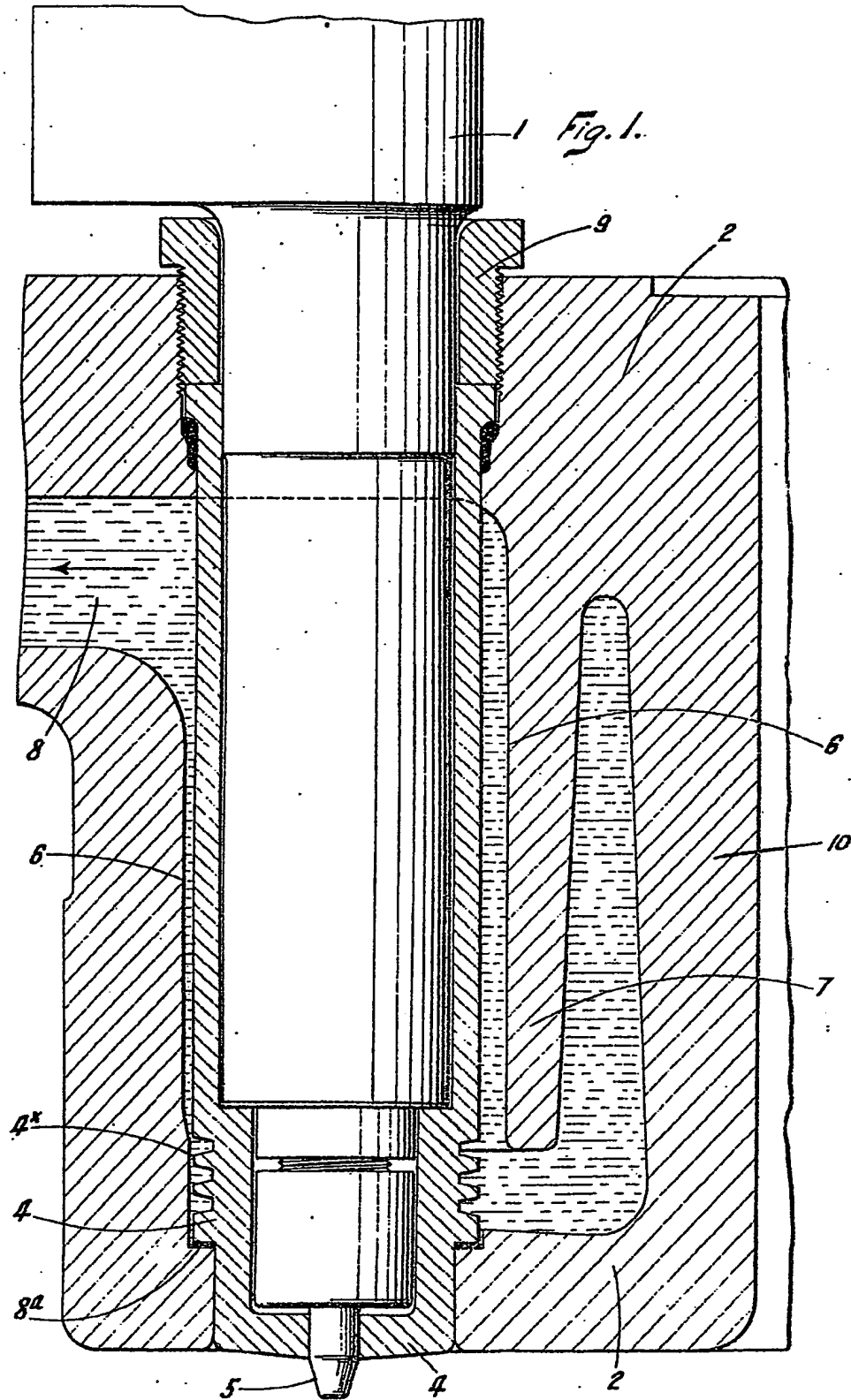
3. A cylinder head fitted with water cooled fuel injection valves constructed substantially as described and shown in the accompanying drawings.

Dated this 20th day of March, 1928.

For the Applicants,

LLOYD WISE & Co.,  
10, New Court, Lincoln's Inn, London,  
W.C. 2,  
Chartered Patent Agents.

[This Drawing is a reproduction of the Original on a reduced scale.]



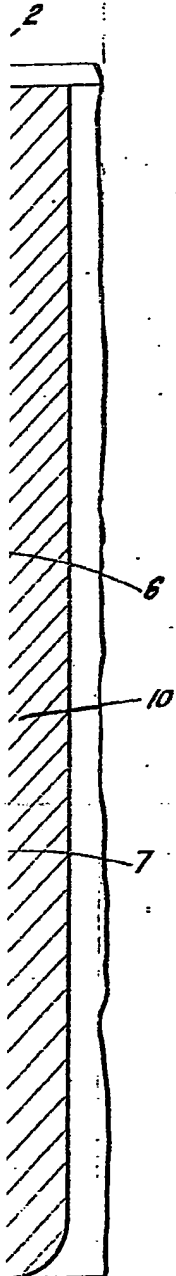


Fig. 2.

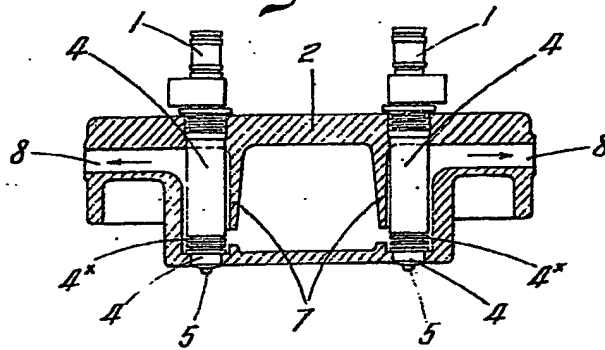
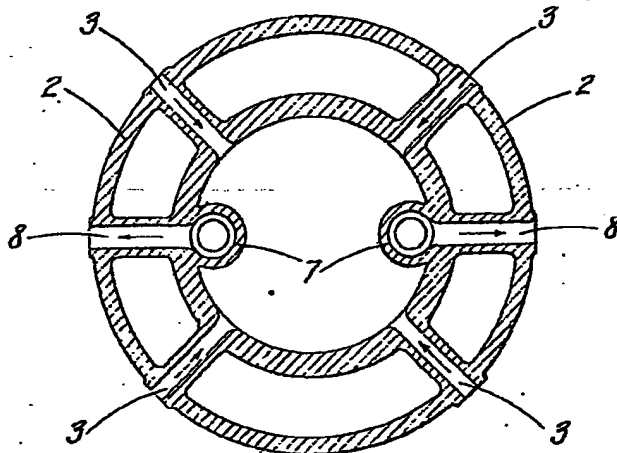


Fig. 3.



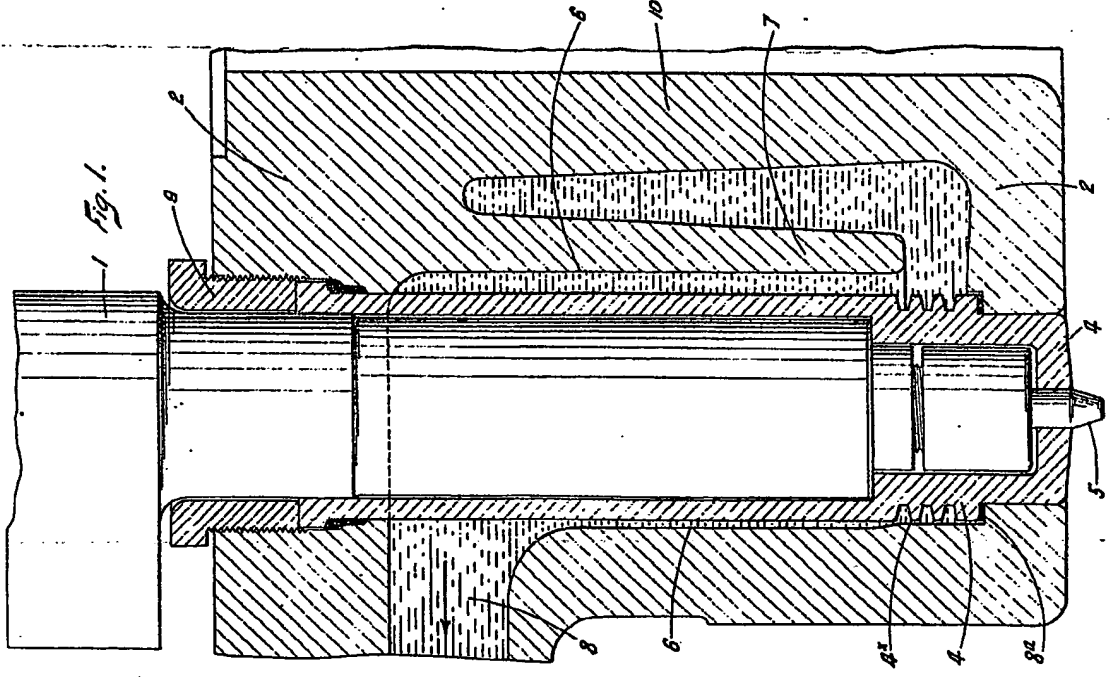


Fig. 1.

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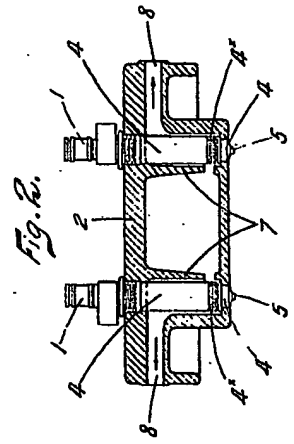


Fig. 2.

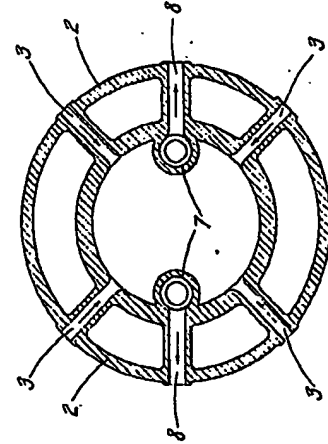


Fig. 3.